UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHARLES D. SNELLING and LEO T. VAN LAHR

Appeal No. 2004-2159
Application No. 09/819,943

ON BRIEF

Before KIMLIN, GARRIS and DELMENDO, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-3 and 9-17. Claims 5-8, the other claims remaining in the present application, have been allowed by the examiner. Claim 1 is illustrative:

1. A system for detecting the level of liquid in a vessel, comprising:

a detector assembly including

a thermally conductive substrate,

a heater mounted on said substrate such that said heater is thermally coupled to the interior of the vessel, said heater

being able to be actuated to add heat to the surface of the substrate thermally coupled to the interior of the vessel, and

a sensor mounted on said substrate in proximity to said heater such that discrete elevations of the interior of the vessel are thermally coupled to corresponding longitudinal portions of said sensor to generate an electrical signal defining a temperature signal, said correspondence being incrementally continuous such that the elevations corresponding to said portions of said sensor increase from one to the other of the ends of said sensor, said sensor being able to be actuated to detect the temperature in the vessel in proximity to the sensor indicative of the temperature detected by said sensor, said sensor having a vertical dimension sufficiently large such that said temperature signal will vary in proportion to said longitudinal portion of said sensor thermally coupled to the liquid;

a processor electrically connected to said sensor for receiving said temperature signal after actuation of said heater, said processor being programmed to use said temperature signal to calculate the elevation of the upper surface of the liquid in the vessel thereby to generate an electrical signal defining an elevation signal indicative of the elevation of the liquid upper surface relative to the lower end of said sensor;

an interface electrically connected to said processor for receiving said elevation signal for use as the basis for communicating to the user the elevation of the liquid upper surface; and

a power supply electrically connected to said heater, sensor, processor, and interface, and wherein said sensor comprises a variable resistance means wherein the resistance to electrical conductivity of said sensor varies in proportion to the temperature detected by it, said temperature signal being of a magnitude proportional to the magnitude of the resistance, said programming of said processor comprising using said temperature signal to measure said resistance of said sensor, said programming further comprising using said resistance to calculate the elevation of the upper surface of the liquid.

In the rejection of the appealed claims, the examiner relies upon the following references:

Sergeant	3,461,446	Aug. 12, 1969
Petersen	3,485,100	Dec. 23, 1969
Wallrafen	5,719,332	Feb. 17, 1998

Appellants' claimed invention is directed to a system for detecting the level of liquid in a vessel. The system comprises a detector which includes a thermally conductive substrate, a heater mounted on the substrate, and a sensor mounted on the substrate in proximity to the heater. As recited in claim 1, "discrete elevations of the interior of the vessel are thermally coupled to corresponding longitudinal portions of said sensor to generate an electrical signal defining a temperature signal." Also, claim 1 recites that "said sensor having a vertical dimension sufficiently large such that said temperature signal will vary in proportion to said longitudinal portion of said sensor thermally coupled to the liquid." In addition, a processor is electrically connected to the sensor and is programmed to use the temperature signal to calculate the elevation of the upper surface of the liquid in the vessel. Also, the system recited in independent claim 11 comprises upper, intermediate and lower sensors.

Appealed claims 1, 2, 9-11 and 13-17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Petersen. Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Petersen in view of Sergeant, and claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Petersen in view of Wallrafen.

Appellants submit at page 5 of the principal brief that "claims 1-3, 9-10, 13-14 and 16-17 are grouped to rise and fall together," and that "claims 11 and 12 are grouped to rise and fall together."

Appellants do not contest the examiner's separate § 103 rejections of claims 3 and 12. Indeed, the only issue stated by appellants at page 4 of their principal brief is "[w]hether claims 1, 2, 9-11 and 13-17 are anticipated by Peterson [sic, Petersen]." Accordingly, we consider appellants to have conceded the propriety of the examiner's § 103 rejections of claims 3 and 12, which are dependent upon independent claims 1 and 11, respectively, if the examiner's § 102 rejection of claims 1 and 11 is upheld. We, therefore, consider appellants' position to be that the § 103 rejections of claims 3 and 12 stand or fall together with the § 102 rejections of claims 1 and 11.

We have thoroughly reviewed each of appellants' arguments for patentability. However, we are in complete agreement with the examiner that Petersen describes the systems of claims 1 and 11 within the meaning of 35 U.S.C. § 102. Accordingly, we will sustain the examiner's rejections for essentially those reasons expressed in the Answer, and we add the following primarily for emphasis.

There is no dispute that Petersen, like appellants, describes a system for detecting the level of liquid in a vessel, which system includes a substrate 30 mounted on a heater and an elongated temperature-dependent resistance sensor 34. A principal contention of appellants is that because Petersen discloses that rod 30 is composed of insulating material, the reference does not describe a "thermally conductive substrate," as presently claimed. However, as explained by the examiner and acknowledged by appellants, Petersen expressly discloses that "[t]he heating effect across the rod is very good because of the small thickness of material between the two grooves **31** and **32**" (column 4, lines 34-36). Accordingly, although the rod of Petersen is made of insulating material, its configuration is such that it effects heat-transfer and, therefore, meets the requirement of the broadly claimed "thermally conductive

substrate." While appellants point out that the heat-transfer of the reference rod is poor in the longitudinal direction, the broadly claimed thermally conductive substrate does not require anything more than poor heat-transfer in the longitudinal direction. Also, appellants have not refuted the examiner's logical argument that "the operation of Petersen relies on a thermally conductive rod 30 to transfer heat from a resistor to bring temperature sensitive resistors to a first temperature (which are cooled by contact with a liquid thus resulting in a liquid level determination), and would be inoperative with a thermally insulating rod" (page 6 of Answer, first paragraph).

Appellants also contend that Petersen does not describe the claim 11 limitation of an "intermediate sensor having a vertical dimension sufficiently large such that said temperature signal will vary in proportion to said longitudinal portion of said intermediate sensor thermally coupled to the liquid." However, we concur with the examiner that the embodiments of Petersen depicted in Figures 3 and 4 meet the claim requirements for upper, intermediate and lower sensors. Intermediate sensors 19 and 20 of Figure 3 and 27 and 28 of Figure 4 have a greater dimension in the longitudinal direction, and we agree with the examiner that "[s]ince the resistors of Figures 3 or 4 are stated

to consist of the same longitudinally temperature responsive material as that of Figure 5" (page 7 of Answer, second paragraph), it necessarily follows that the intermediate sensors of Petersen have the requisite vertical dimension that is sufficiently large that the temperature signal will vary in proportion to the longitudinal portion of the sensor coupled to the liquid. Appellants have presented no argument, let alone evidence, which establishes that the vertical dimensions of Petersen's intermediate sensors are not sufficiently large to function like the claimed intermediate sensors.

Appellants further maintain that "claim 11 is not anticipated because Petersen does not disclose the limitation of claim 11 reciting that the upper and lower sensors 'generate respective electrical signals each defining a temperature signal" and that the processor 'use said temperature signals to calculate the elevation'" (page 11 of principal brief, second paragraph). However, we agree with the examiner that:

> [S]ince each resistor [of Petersen] is comprised of temperature-sensitive material, and each resistor produces a signal responsive to the temperature of the resistor (which changes due to thermal coupling with different liquid levels), the resistors clearly generate respective electrical signals each defining the temperature of the resistor. Each of the plural, discrete temperature signals is summed by a measurement circuit acting as a processor to calculate the elevation of the liquid (column 4 lines 13-14).

(Page 9 of Answer, first paragraph). While appellants contend that "claim 11 clearly recites a parallel relation between the connection from upper sensor to the processor and the lower sensor connected to the processor where the processor is 'electrically connected to **each** of said sensors for receiving **said temperature signals**'"(page 9 of Reply Brief), as opposed to resistors 26-29 of Petersen operating in series, claim 11 on appeal fails to recite any such parallel relationship. We agree with the examiner that the upper and lower sensors of Petersen each generates electrical signals that define temperature signals that are transmitted to the processor to calculate the elevation of the liquid in the vessel. Claim 11 on appeal does not require that the generated electrical signals be transmitted separately, in parallel, to the processor. Manifestly, as required by the claim, the processor of Petersen has an electrical connection to each of the upper and lower sensors.

In conclusion, based on the foregoing and the reasons well-stated by the examiner, the examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN)
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